Patent Claims

1. A method for determining a distance from surface paneling modules of a surface paneling module arrangement to at least one reference position, with electronic messages being interchanged between processor units of mutually adjacent surface paneling modules,

- with the surface paneling module arrangement having two or more surface paneling modules, and with each surface paneling module having:
  - at least one electrical power supply connection,
  - at least one data transmission interface,
  - at least one processor unit which is coupled to the electrical power supply connection and to the data transmission interface,
  - with the processor unit being designed such that electronic messages are interchanged between the processor unit and a processor unit for an adjacent surface paneling module, which is coupled to the surface paneling module, in order to determine the respective distance of a processor unit from a reference position
  - with each message containing distance information which indicates the distance of the surface paneling module of a processor unit which is sending the message or the distance of the surface paneling module of a processor unit which is receiving the message from the reference position,
  - with the processor unit being designed such that the actual distance to the reference position can be determined or can be stored from the distance information in a received message,

- with the method having the following steps, which are carried out for all the surface paneling modules in the surface paneling module arrangement:
  - a first message is produced by a processor unit of a first surface paneling module, with the first message containing first distance information which contains the distance of the first surface paneling module or the distance of a second surface paneling module which receives the first message from the reference position,
  - the first message is sent from the processor unit of the first surface paneling module to the processor unit of the second surface paneling module,
  - the distance of the processor unit of the second surface paneling module from the reference position is determined or stored as a function of the distance information,
  - the processor unit of the second surface paneling module produces a second message which contains second distance information which contains the distance of the second surface paneling module or the distance of a third surface paneling module which receives the second message, from the reference position,
  - the second message is sent from the processor unit of the second surface paneling module to the processor unit of the third surface paneling module,
  - the distance of the third surface paneling module from the reference position is determined or stored as a function of the second distance information,

- wherein before the determination of the distance of the surface paneling modules from the reference position, the physical positions of the surface paneling modules within the surface paneling module arrangement are determined in that, on the basis of a surface paneling module at an introduction point of the surface paneling module arrangement, position determination messages which have at least one row parameter z and one column parameter s (which contains the row number or column number, respectively, of the processor unit sending the message or the row number or the column number, respectively, of the processor unit receiving the message within the surface paneling module arrangement) are in each case transmitted to processor units of adjacent surface paneling modules, and the respective processor unit carries out the following steps:
  - if the row parameter in the received message is greater than the previously stored row number of the processor unit, then the processor unit's own row number is allocated the row parameter value z of the received message,
  - if the column parameter in the received message is greater than the processor unit's own column number, then the stored column number is allocated the row parameter value of the received message,
  - if its own row number and/or its own column number have/has been changed on the basis of the method steps described above, then new position measurement messages are produced with new row parameters and new column parameters, which each contain the row number and the column number of the processor unit sending the message or the row number and the column number of the processor unit receiving the message, and these are transmitted

to a processor unit of a respective adjacent surface paneling module.

2. The method as claimed in claim 1,

- in which, in an iterative method, the processor unit of the surface paneling module's own distance value is changed if the previously stored distance value is greater than the received distance value (increased by a predetermined value) in the respectively received message, and
- in which, in the situation where a processor unit of a surface paneling module changes its own distance value, this produces a distance measurement message and sends this to processor units of adjacent surface paneling modules, with the distance measurement message in each case containing its own distance as distance information or the distance value which the receiving processor unit has from the portal processor.

3. The method as claimed in claim 2, in which the distance value has a value which is greater by a predetermined value than its own distance value.

4. The method as claimed in one of claims 1 to 3, in which each surface paneling module has a plug connector in which the electrical power supply connection and the data transmission interface are integrated.

5. The method as claimed in one of claims 1 to 4, in which each surface paneling module has at least one electrical power line and at least one data line,

wherein the processor unit is coupled to the electrical power supply connection by means of the electrical power line, and is coupled to the data transmission interface by means of the data line.

6. The method as claimed in one of claims 1 to 5, in which each surface paneling module is designed as one of the following modules:

- wall paneling module, or
- floor paneling module, or
- ceiling paneling module.

7. The method as claimed in one of claims 1 to 6, in which each surface paneling module is designed as

- a tile, or
- a wall tile, or
- a parquet flooring element, or
- a laminate element.

8. The method as claimed in one of claims 1 to 7, in which at least some of the surface paneling modules have at least one sensor which is coupled to the processor unit.

9. The method as claimed in one of claims 1 to 8, in which at least some of the surface paneling modules have at least one of the following elements, which is coupled to the processor unit:

- imaging element, or
- sound wave production element, or
- vibration production element.

10. A surface paneling module arrangement having two or more surface paneling modules,

- with each surface paneling module having:

- at least one electrical power supply connection
- at least one data transmission interface,
- at least one processor unit which is coupled to the electrical power supply connection and to the data transmission interface,
- with the processor unit being designed such that electronic messages are interchanged between the processor unit and a processor unit for an adjacent surface paneling module, which is coupled to the surface paneling module, in order to determine the respective distance of a processor unit from a reference position,
- with each message containing distance information which indicates the distance of the surface paneling module of a processor unit which is sending the message or the distance of the surface paneling module of a processor unit which is receiving the message from the reference position, and
- with the processor unit being designed such that the actual distance to the reference position can be determined or can be stored from the distance information in a received message,

- with the surface paneling module arrangement being designed to carry out a method for determining a distance from surface paneling modules of a surface paneling module arrangement to at least one reference position, with electronic messages being interchanged between processor units of mutually adjacent surface paneling modules, with the method having the following steps, which are carried out for all the surface paneling modules in the surface paneling module arrangement:
  - a first message is produced by a processor unit

of a first surface paneling module,
with the first message containing first distance information which contains the distance of the first surface paneling module or the distance of a second surface paneling module which receives the first message from the reference position,

- the first message is sent from the processor unit of the first surface paneling module to the processor unit of the second surface paneling module,
- the distance of the processor unit of the second surface paneling module from the reference position is determined or stored as a function of the distance information,
- the processor unit of the second surface paneling module produces a second message which contains second distance information which contains the distance of the second surface paneling module or the distance of a third surface paneling module which receives the second message, from the reference position,
- the second message is sent from the processor unit of the second surface paneling module to the processor unit of the third surface paneling module,
- the distance of the third surface paneling module from the reference position is determined or stored as a function of the second distance information,

- with the surface paneling module arrangement being designed such that before the determination of the distance of the surface paneling modules from the reference position, the physical positions of the surface paneling modules within the surface

paneling module arrangement are determined in that, on the basis of a surface paneling module at an introduction point of the surface paneling module arrangement, position determination messages which have at least one row parameter z and one column parameter s (which contains the row number or column number, respectively, of the processor unit sending the message or the row number or the column number, respectively, of the processor unit receiving the message within the surface paneling module arrangement) are in each case transmitted to processor units of adjacent surface paneling modules, and the respective processor unit carries out the following steps:

- if the row parameter in the received message is greater than the previously stored row number of the processor unit, then the processor unit's own row number is allocated the row parameter value z of the received message,
- if the column parameter in the received message is greater than the processor unit's own column number, then the stored column number is allocated the row parameter value of the received message,
- if its own row number and/or its own column number have/has been changed on the basis of the method steps described above, then new position measurement messages are produced with new row parameters and new column parameters, which each contain the row number and the column number of the processor unit sending the message or the row number and the column number of the processor unit receiving the message, and these are transmitted to a processor unit of a respective adjacent surface paneling module.

11. A textile fabric structure having a processor arrangement,

- with the processor arrangement having:
  - at least one interface processor which provides a message interface for the processor arrangement,
  - a large number of processors, with, at least in some cases, only those processors which are arranged physically directly adjacent to one another being coupled to one another in order to interchange electronic messages,
  - with each processor of the large number of processors being allocated a sensor and/or an actuator and being coupled to the respective processor with sensor data and/or actuator data being transmitted in the electronic messages from and/or to the interface processor,
  - with the processors which are arranged physically directly adjacent to one another at least in some cases being coupled to one another in accordance with a regular coupling topology whose degree is greater than unity,
- with the processors and/or sensors and/or actuators being arranged in the textile fabric structure,
- having electrically conductive threads which couple the processors to one another,
- having conductive data transmission threads which couple the processors to one another, and
- having electrically non-conductive threads.

12. The textile fabric structure as claimed in claim 11,
in which the processors which are arranged physically directly adjacent to one another are coupled to one

another in accordance with a regular bus coupling topology.

13. The textile fabric structure as claimed in claim 12,
in which the processors which are arranged physically directly adjacent to one another are coupled to one another in accordance with a regular ring coupling topology.

14. The textile fabric structure as claimed in claim 12,
in which the regular bus coupling topology is designed in accordance with one of the following communication interface standards:

- serial parallel interface,
- controller area network interface, or
- I^2C interface.

15. The textile fabric structure as claimed in one of claims 11 to 14,
in which the processors are arranged in rows and columns in the form of a matrix.

16. The textile fabric structure as claimed in one of claims 11 to 15,
in which the electrically conductive threads are designed such that they can be used to supply power to the two or more processors and/or sensors and/or actuators.

17. The textile fabric structure as claimed in one of claims 11 to 16,
in which the conductive data transmission threads are electrically conductive.

18. The textile fabric structure as claimed in one of claims 11 to 16,
in which the conductive data transmission threads are optically conductive.

19. The textile fabric structure as claimed in one of claims 11 to 18,
in which the actuator is designed as at least one of the following elements:

- imaging element, or
- sound wave production element, or
- vibration production element.

20. A surface paneling structure,
in which surface paneling is fixed on a textile fabric structure as claimed in one of claims 11 to 19.

21. The surface paneling structure as claimed in claim 20,
in which the surface paneling is adhesively bonded and/or laminated and/or vulcanized onto the textile fabric structure.

22. The surface paneling structure as claimed in claim 20 or 21,
in which the surface paneling structure is designed as

- wall paneling structure, or
- floor paneling structure, or
- ceiling paneling structure.

23. The surface paneling structure as claimed in one of claims 20 to 22,
in which a textile layer through which electrically conductive wires pass uniformly is applied at least

over subareas of the textile fabric structure.